

MALLOPHAGA.—By C. Giebel.*

(Plate XIV.)

The Mallophaga entrusted to me for examination were collected from *Pelecanoides*, *Prion*, *Halobæna*, *Diomedea*, and *Aptenodytes*, and comprise species of the genera *Docophorus*, *Nirmus*, *Goniodes*, and *Lipeurus*. Only one, and that the commonest, obtained from *Procellaria nereis*, *Prion desolatus*, and perhaps also from *Diomedea exulans*, was previously known, having been recorded from *Halobæna cærulea*. The four additional species described as new are separated by very marked characters from all others hitherto known in their respective genera. Among them *Goniodes brevipes* from *Aptenodytes longirostris* is particularly interesting, because no *Philoptera* at all were known from this bird, and this genus has been observed on *Natatores* only once before, being especially parasitic upon *Gallinaceæ*. *Pelecanoides* also had previously furnished no Mallophaga, and the species of *Nirmus* procured from it is very distinct. The *Docophorus dentatus* from *Diomedea exulans* is remarkable on account of its relationship to a species observed on a *Vultur*, from which it is distinguished by very precise differentia.

Docophorus dentatus.

(Plate XIV., fig. 16.)

Giebel, Ann. & Mag. of Nat. Hist. 1876, May, xvii. 388.

Brevis, latus, capite rotundato truncato-trigono, marginibus lateralibus multisetosis, posticis gracillime bidentatis; antennis setaceis; signatura frontali feminis triangulari in lineam mediam occipitalem exeunte. Thorace brevi, lato; metathoracis hexagonis angulis posticis dentiformibus; pedibus brevibus, tibiis multispinosis. Abdomine orbiculari, maculis marginalibus intus rotundatis, ventralibus partitis.

Mas obscurior, marginibus profunde crenatis, fasciis in medio divisis.

Long. corp. 3.—3.75 mm., capit. 1.25 mm., thorac. 0.75 mm., abd. 1.75 mm.

This species is distinguished from all other known *Docophori* by its abundant and strong lateral setæ, the two backward processes of the hind margin of the temporal border, and by the excised apex of the retro-duced metanotum. It is short, broad and plump, like *D. brevicollis* from *Vultur monarchus*; but differs from that species in the peculiar formation and the characteristic markings of the body.

Head short, broad, the fore-part shorter than the hinder; clypeus broad, almost truncate in front, beset with short scattered hairs; trabeculæ very long, acute,

* Translated from the German by the Rev. A. E. Eaton and Mr. R. M'Lachlan.

extending backwards over the antennal sinus; tempora outwardly expanded, broad, convex, with long setæ at the lateral margins, posteriorly with a concolorous, irregular, tooth-like process prolonged backwards on either side. Antennæ inserted in a deep sinus before the middle of the head, filiform; the basal joint the strongest and somewhat shorter than the second joint which is the longest, the others gradually tapering, the third joint shorter than the second and longer than the fourth which is subequal to the fifth. The brown frontal marking forms an equilateral triangle, extending beyond the middle of the head, and emits a fine pale line from its apex to the middle of the occipital border, and another from each of its obtuse lateral angles to the frenal margin. Thoracic segments transverse, bordered with brown, divided longitudinally by a fine median line: prothorax narrowed posteriorly, the lateral angle bearing one seta and slightly projecting shortly before the sub-convex hinder margin; meta-thorax broad, transversely 6-sided, lateral angles rounded and beset with several long setæ, hinder angles acute. Legs very short and stout, the femora and tibiæ with scattered hairs, the latter fringed with shorter stiff bristles along the inner edge, and with two long strong spines at the apex; ungues long. Abdomen sub-orbicular, the sides only very slightly crenate, beset with the usual setæ, and with short scattered hairs on the disk above and beneath: segments above marked with brown freckles which coalesce at the lateral borders, and are produced inwards into slightly narrower stripes of even width whose obtuse ends surround a narrow middle space; from the second segment up to the antepenultimate these markings are intersected by a pale band running parallel with the side of the abdomen: on the ventral surface the inner row of the spots is more conspicuous than the outer, and under a high magnifying power each of the spots composing it is seen to be subdivided into three contiguous with one another. In the smaller and paler female the apical segment is sharply excised.

In the male (one specimen), which is dark brown, and larger than the female, the frontal marking is much shorter and broader than that of the other sex, is not triangular, and terminates in a median tooth-like point exactly between the antennæ. The abdomen above up to the penultimate segment has the brown bands interrupted by a pale median line only, instead of by a band: beneath, this pale median space is present only in the anterior part, the bands being continuous in the hinder segments, and the brown lateral margin is sharply separated from the bands. The sharply produced posterior angles of the apical segment are serrate.

Hab.—On *Diomedea exulans*, among the breast feathers. Five examples collected in March 1875.

Although similar sexual differences have not yet been observed in any other species of *Docophorus*, yet on considering the agreement in other respects between the female examples and this darker and larger male, I dare not separate these two forms.

From *Diomedea* Nitzsch mentions only *Docophorus thoracicus*. His types

being no longer at hand a comparison is not possible; but since he states that that species agrees with *Lipeurus taurus* in size and colour, it must be distinct from ours. *Doc. brevicollis* (Giebel, Insecta epizoa tab. x. 7) from *Vultur monarchus* is allied to *Doc. dentatus* in general habit and markings; but a close comparison reveals very considerable differences in the form, and also in the lesser details of the ornamentation.

Nirmus angulicollis.

(Plate XIV., fig. 17.)

Giebel, Ann. & Mag. of Nat. Hist. 1876, xvii. 388.

Oblongus, fulvus, fusco-pictus; capite semi-elliptico, antice brevi-rotundato, antennis ante medium insertis; prothoracis angulis anticis acute exstantibus, metathoracis coarctati angulis obtusis; abdomine angusto marginibus crenatis, maculis rectangulatis ventralibus bipartitis.

Long. corp. 3.25 mm., capit. 0.50 mm., thorac. 0.75, abd. 2 mm.

A species distinguished from all others similar to it by the configuration of the head, and still more by the peculiar form of the two thoracic segments.

Head as broad in front as behind, anteriorly rounded abruptly and furnished with 8-10 marginal bristles on each side. Foremost angle of the deep antennal sinus not at all prominent; the hinder angle, on the contrary, has a very considerable eye knob. Temporal margins parallel with one another, studded with minute and distant hairs; occipital margin slightly emarginate. The antennæ reach about as far as the occipital margin; the basal joint stout, the second the longest, the third equal to the fourth and the shortest, the fifth thicker and somewhat longer; all have long, fine, minute, distant hairs, and the apical joint is terminated with a tuft of bristles. Head pale brown, with dark brown spots before and after the antennal groove, and with two such spots, triangular, at the occipital border; tempora rather darker than the middle of the head. Thorax brown, with a pale longitudinal median line: prothorax as wide as the occiput, somewhat transverse; the neck contracted in front in the sinus of the occipital margin; its acute anterior lateral angles extend sideways as widely as the rounded temporal angles; in advance of the rounded posterior angles the sides of the prothorax appear somewhat narrowed, and they are destitute of marginal setæ. The much longer metathorax is slightly narrowed before the middle, and has rounded angles destitute of bristles. Legs slender, brown, with pale apices to the joints, and with fine little hairs; femora and tibiæ of almost equal length and strength, the last with several strong apical spines; ungues strongly curved. The abdomen attains its greatest width at the 5th and 6th segments; at the 7th it again becomes somewhat narrower; the last two segments are greatly abbreviated and suddenly narrowed: the hinder angles of the segments, though acute, project only a little, and hence the sides of the abdomen are merely slightly crenate; their setæ usually become more numerous towards the

apex, but are not very long; the 8th segment has on each side a marginal process, and as well as the 9th has numerous setæ at the hinder margin. Above, the foremost seven segments are marked with transverse quadrangular brown spots separated from one another only by the pale median line and the paler joinings of the segments, so that the segment in front and behind has a very dark lateral spot. Beneath, these quadrangular spots are separated into an inner paler row and an outer row of dark spots marked with the stigmata, by means of a pale longitudinal line parallel with the side at the inner half of the spiracular row.

Hab.—On *Diomedea exulans*, with *Docophorus dentatus*; three examples.

The broad rounding of the short fore-head, the acute tooth-like four angles and the lateral marginal excision of the very broad prothorax, as well as the conspicuous contraction of the metathorax before its middle, prevent this new species from being confounded with any of the very numerous known species of this genus. In general habits and marking, it may be placed next to *Nirmus fenestratus* (Giebel, Insekt. Epizoa, 1875, tab. vi. 7) of the Cuckoo.

Nirmus setosus.

(Plate XIV., fig. 18.)

Giebel, Ann. & Mag. of Nat. Hist. 1876, xvii. 388.

Flavus, fusco pictus; capite obtuse trigono-cordato, temporibus late rotundatis, multisetosis; prothorace lato, metathorace trapezoidali angulis lateralibus obtusis, setis multis atque longis instructis; abdomine oblongo marginibus obtuse crenatis, segmentisque fusco-vittatis.

Long. corp. 2 mm., capit. 0.20 mm., thorac. 0.20 mm., abd. 1.20 mm.

This elongated pale yellow species with darker edging has its most striking characters in the copious bristling of the tempora and of the thorax.

Head somewhat longer than its width behind, narrowed rather suddenly in front of the antennæ to about $\frac{1}{3}$ of its greatest breadth, the clypeus border strongly convex, terminated by two setæ on each side, behind which stands on both sides a long marginal seta in the midst of the labrum. Anterior angle of the antennal sinus prominent and acute, furnished at the base with a small spine. The hind-head has broad rounded tempora, each of which carries six long setæ, which project in part over the metanotum. Antennæ with the basal joint long and stout, the second somewhat shorter and more slender, the third equal to the fourth and shorter still, the fifth again rather longer and with a tuft of bristles at the end. Prothorax transverse, widest behind the middle, bearing four long setæ behind the obtusely rounded lateral angles. Metathorax longer but not broader, with a tuft of yet longer bristles at its even blunter posterior lateral angles. Legs slender; the femora rather shorter and stouter than the tibiæ, both of them with minute scattered hairs. Abdomen narrow, slender, widened only a little posteriorly, and narrowed again so as to terminate obtusely: the first of the posterior lateral angles of the segments

has one minute spine, the second two, and the following have three and four long setæ of unequal length; the broadly trilateral apical segment has a short seta, and in some examples bears a triangular plate covering the anal aperture. Above and beneath, the segments have small scattered hairs.

Body pale yellow (in immature specimens whitish, with narrow brown edgings), the labrum and antennal sinus, as well as two slender triangular occipital spots which are prolonged as temporal lines convergently to the dark eye-spots, brown. Thorax margined at the sides with brown. The anterior abdominal segments have acute marginal brown spots about their middle, and these are themselves connected by means of bands on each side, which, though narrowed in the middle, are still continuous; in the posterior segments these markings become paler, and they are wanting in the apical segment; the spots encircling the stigmata become dark brown at the lips of these orifices.

Hab.—On *Pelecanoides urinatrix*, in the white feathers of the breast and belly. Six examples, two of them immature, captured on the 14th October 1874 at Observatory Bay, Kerguelen Island.

Among the known species, *Nirmus fusco-marginatus* is nearly related to the present insect; but it is distinguished from the Kerguelen animal by its more decidedly narrowed fore-head, and by its wanting the abdominal bands. *Nirmus depressus* on *Phalacrocorax brasiliensis* differs in the widened form of the thoracic segments, and in its oval, very differently marked abdomen. The similar species inhabiting the Gulls and Terns are readily separable by their white colour and black decoration. The long strong bristles of the temples and of the angles of the thoracic segments also afford to the eye marked peculiarities, from which the name is taken.

Goniodes brevipes.

(Plate XIV., fig. 19.)

Giebel, Ann. & Mag. of Nat. Hist., 1876, xvii. 389.

Capite thoraceque flavis, fusco-marginatis; abdomine albido, maculis marginalibus fuscis oblique fusiformibus: capite antice parabolico temporibus dilatatis, angulatis, postice in dentem prolongatis; antennis brevibus; prothorace transverse oblongo; metathoracis latioris lateribus angulatis margine postico valde convexo; pedibus brevissimis; abdomine late ovali, marginibus lente crenatis, segmentis setigeris, ultimo lato emarginato.

Long. corp. ♀ 1.50 mm.

Parabolic margin of the fore-head evenly beset with only fine short hairs; the obtuse anterior angles of the outwardly and posteriorly greatly expanded tempora have three minute spines apiece; the tooth-like posterior temporal angles extend backwards as far as the middle of the prothorax, and from each of them a strong bristle is prolonged further over it; the occipital margin, excavated between these

acute angles, is, in the middle, again rather convex. Antennæ sunk in a shallow lateral sinus in the middle of the head, very short, hardly reaching as far as the anterior temporal angles; the short, stout, and obtusely conical basal joint with short scattered hairs, the next three joints obviously shorter and successively decreasing in length; the obliquely truncate extremity of the apical joint has a little tuft of bristles. Prothorax twice as long as wide, the sides slightly convex, the hind margin very convex, destitute of marginal setæ: metathorax shorter but conspicuously broader, its obtuse lateral angles very prominent, each of them with three long setæ and a minute spine in front of these, its very convex, almost angular, posterior margin encroaches deeply upon the abdomen. Legs short and weak, with minute scattered hairs; tibiæ cylindrical with a brown terminal annulus; tarsal joints short, annular, with two spines on the inner margin; ungues short, conical. Abdomen compressed, sides sub-parallel, slightly narrowed only at the posterior segments so as to terminate very obtusely: the first segment with 1, the following segments with 2, the posterior segments with 3 or 4 strong marginal setæ, the apical segment with two pairs of them on each side of the median incisure: above, along the middle of the back are dense decumbent setæ, which are most numerous on the fourth segment, but afterwards becoming gradually fewer are altogether absent on the last two segments; beneath, along the middle of the segments the decumbent setæ are less crowded.

Head yellow edged with brown, which colour extends to the anterior temporal angles: on the occipital margin are two narrowly triangular dark brown marginal spots from whose apices the line bounding the region of the vertex is prolonged. In the thorax the brown edging becomes paler especially about the middle. Abdomen yellowish white; the segments have on both sides a pale brown marginal spot pointed inwards and outwards and marked in its middle by the pale stigma; the yellow apical segment has no marginal spot: beneath, the stigmata are very conspicuous through their dark edging.

Hab.—On *Aptenodytes longirostris* among the neck feathers. One specimen obtained in January in Swain's Bay.

G. mammillatus, from *Pelecanus ruficollis*, differs from the present species in its almost quadrate head, its obtuse temporal angles, its much longer antennæ, and its stout femora and long tibiæ. *G. heterocerus* is nearer to it in general habit, and so is *G. chelicornis*; but these are separated clearly by their short fore-head, their shorter posterior temporal angles, their longer antennæ and legs, and by their altogether different setæ and abdominal markings.

Lipeurus clypeatus.

(Plate XIV., fig. 20.)

Giebel, *Insecta Epizoa*, 236; idem, *Ann. & Mag. of Nat. Hist.*, 1876, xvii. 389.

Oblongus fulvus fusco-pictus; clypeo excisuris lateralibus definito; antennis gracilibus; prothorace trapezoidali, metathorace longiore; abdomine anguste oblongo, marginibus profunde crenatis, nigro fuscis, feminae fasciis fuscis.

Long. corp. 2.5 mm., capit. 0.2 mm., thorac. 0.35 mm., abd. 1.75 mm.

♀ Head elongate, narrowed gradually in advance of the antennæ to about $\frac{1}{3}$ of its breadth, ending with the very convex fore margin of the clypeus, which itself is sharply limited on each side by an acutely defined marginal notch; in this notch stand 2 bristles of equal length, and beneath in front of the mandibles is 1 on each side, while posteriorly at the winged margin are 3—5 bristles half as long. The parallel temporal margins, wanting setæ, posteriorly turn inwards at right angles at the slightly concave occipital margin, and each curve has one long marginal bristle. Antennæ inserted after the middle of the head, each in a deep sinus whose anterior angle is acute; their first joint equal in length to the second, the third and fourth considerably shorter, the fifth longer than the penultimate and terminated with tufts of bristles. Prothorax somewhat transverse, and like the metathorax trapezoidal with the sides almost straight and without bristles, only the metathorax has four unequal bristles at the angles. Anterior legs as usual the shortest and stoutest, the other two pairs more slender, the hindmost reaching backwards as far as the middle of the abdomen: coxæ long; trochanters sharply defined; femora slender, longer than the tibiæ, which like them have but few hairs; ungues slender, strongly curved. Abdomen long and narrow, very slightly widened in the middle: segments somewhat transverse, all of equal length from the first, their apical margin slightly convex, their posterior lateral angles obtusely rounded but projecting so as to give a crenate outline to the side; the said angles of the first segment with one seta, the following with three very long unequal setæ, the last two segments with short and minute bristles: above and beneath, the surface has only very scattered bristles.

♀ Head pale yellow, laterally bordered with brown; the clypeus projecting in front, clear and transparent; ocelli black; antennæ without markings. Thorax edged with darker at the sides; legs without markings. Abdomen pale brown bordered with black brown, the edging becoming paler at the last two segments.

♂ Antennæ longer than in the female. Abdomen whitish, with blackish brown marginal spots and pale stigmata.

Hab.—♀ Five examples were captured in the feathers of the neck and breast of *Procellaria nereis* on the 6th Nov. 1874 at Observatory Bay. Another example was previously taken there on *Prion desolatus*, 14th Oct.

♂ One example from the neck feathers of *Diomedea exulans*, in March 1875. As only one specimen lies before me, I am unable to decide whether the differences above described which it presents are indicative of specific distinction from the females with which I have associated it, or are merely sexual peculiarities.

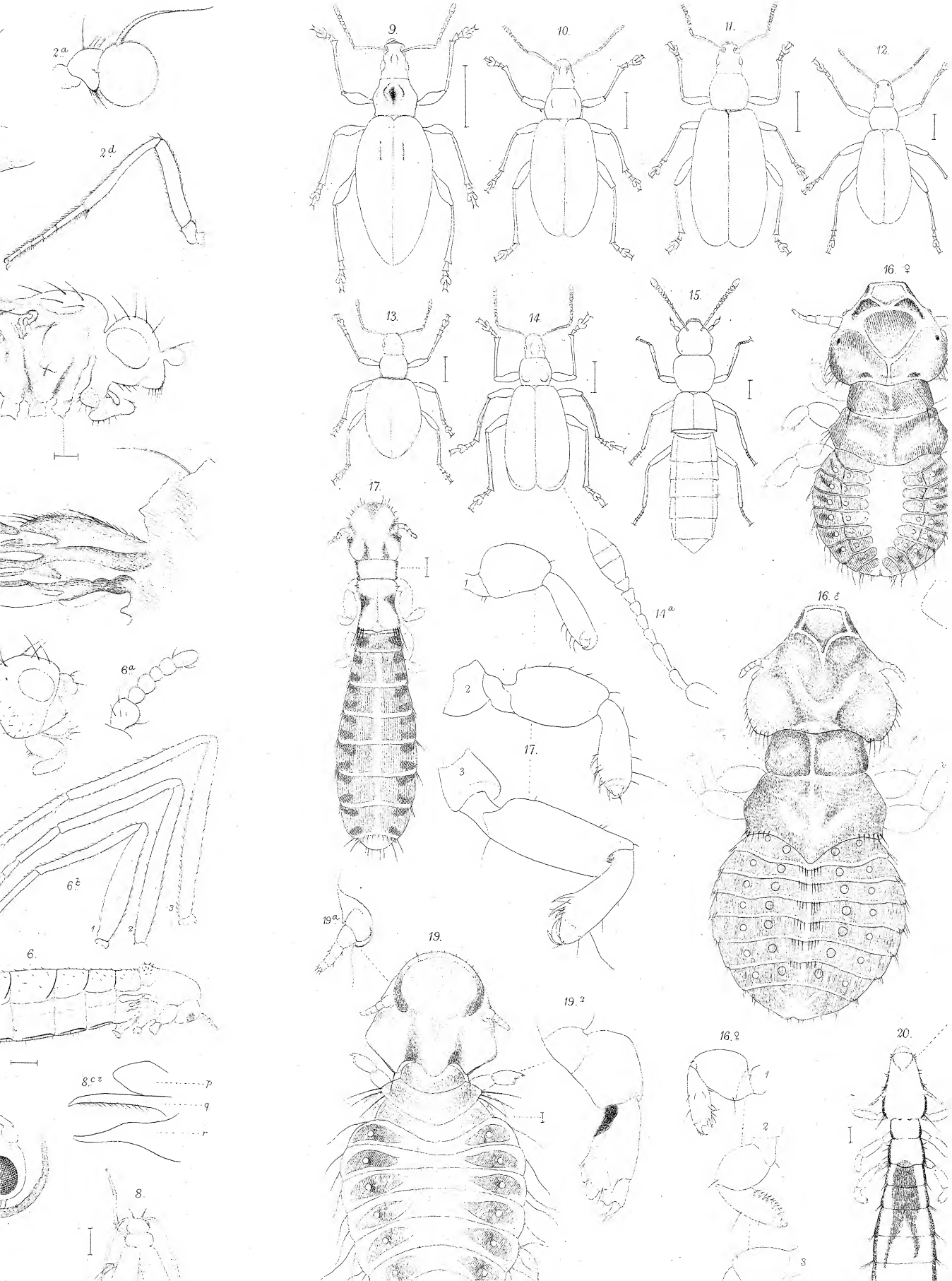
L. clypeatus, first described from several examples from *Halobaena caerulea* in the collection of the Museum of Halle, cannot be confounded with any other known species occurring on the Storm Petrels, owing to the peculiar form of the clypeus, the short antennæ, the trapezoidal segments of the thorax, and the abdominal markings.

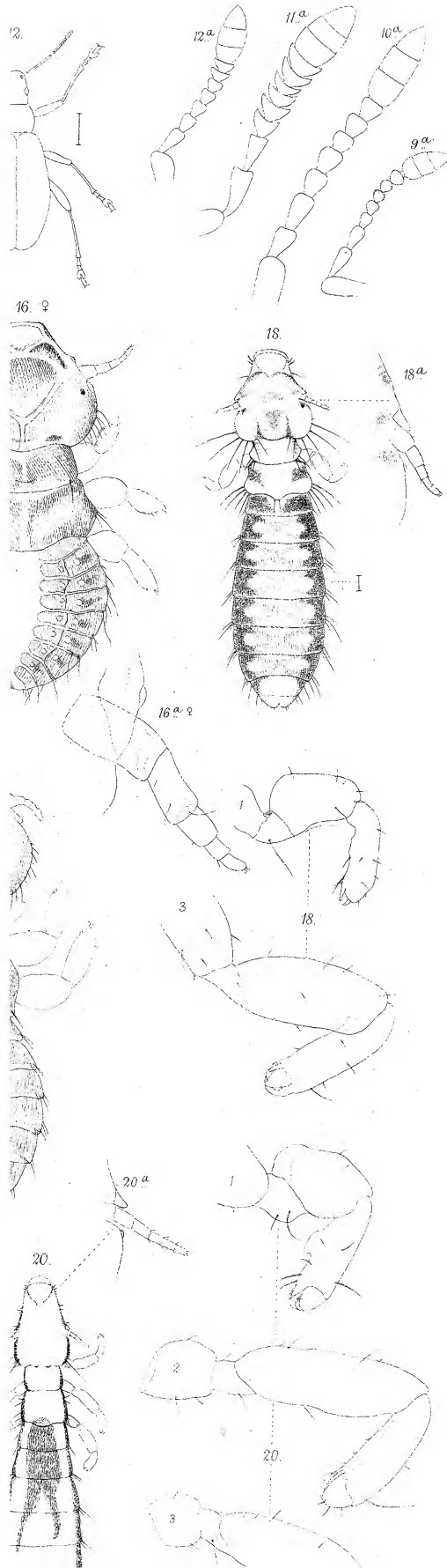
Lipeurus ——— sp ?

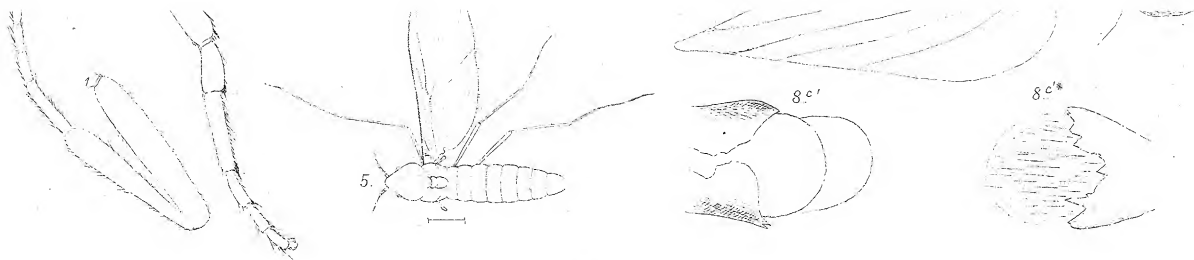
A white skin of a *Lipeurus* 2 mm. long, from the head of *Diomedea fuliginosa*, was obtained in Dec. 1874; but no systematic position can be assigned to it. It is true that Rudow gave a diagnosis of a species from the same bird, under the name *Lipeurus meridionalis* (See Giebel, *Insecta Epizoa*, 255); but that was stated to have an octagonal metathorax, and a broad pale-dull-yellowish abdomen, which peculiarities, to say nothing of the markings, are not shared by our insect; besides the head of that species is compact, whereas in ours it is elongate.



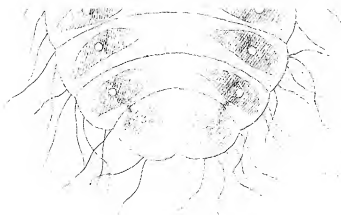
Kerguelen Island.

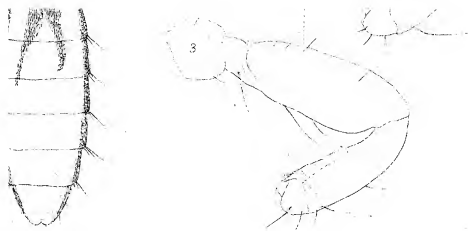






C. D. Waterhouse, A. E. Eaton, & E. Carter del.





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